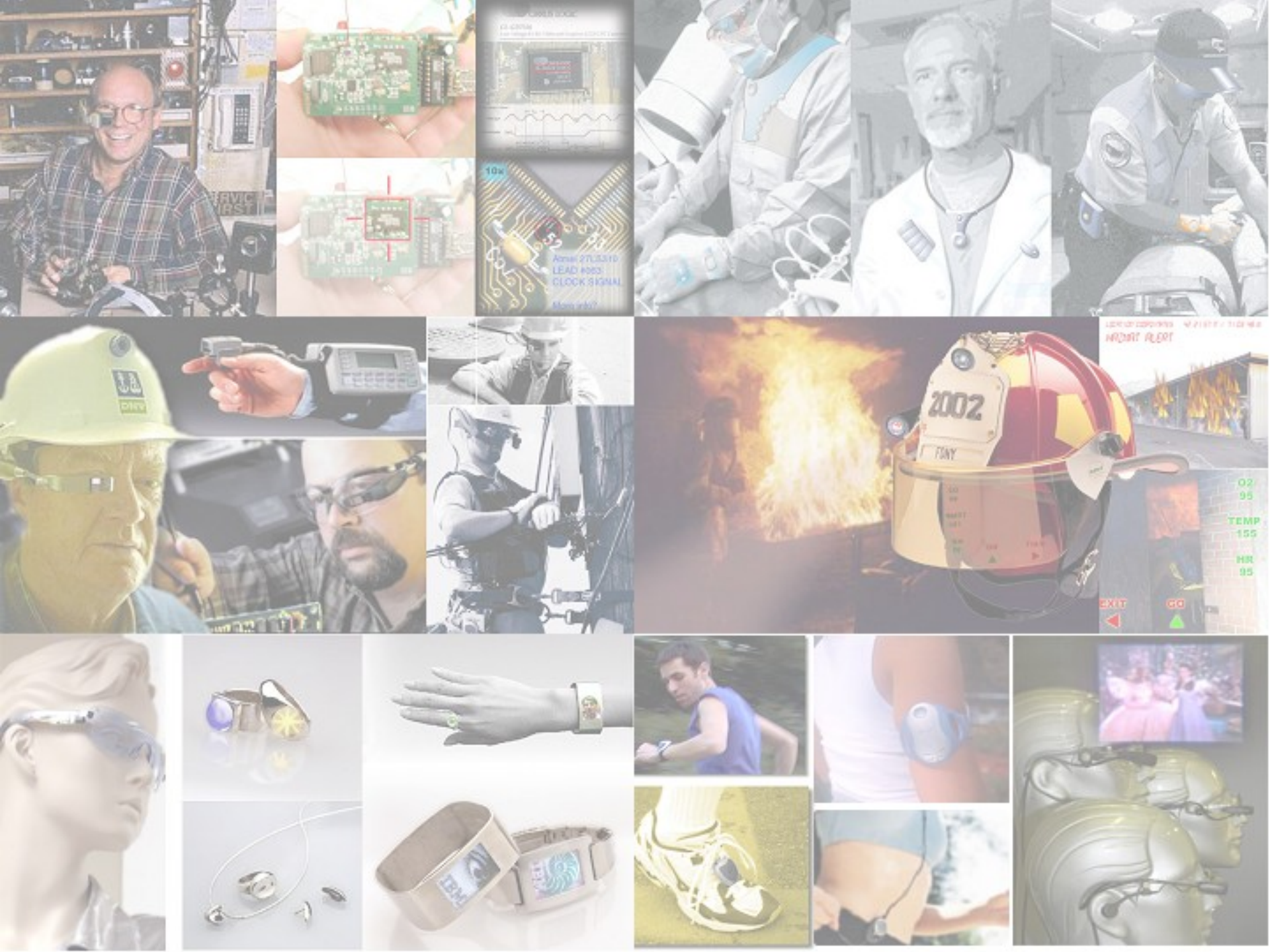
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Wearable Systems for First Responders

Bringing Military Solutions to Homeland Security

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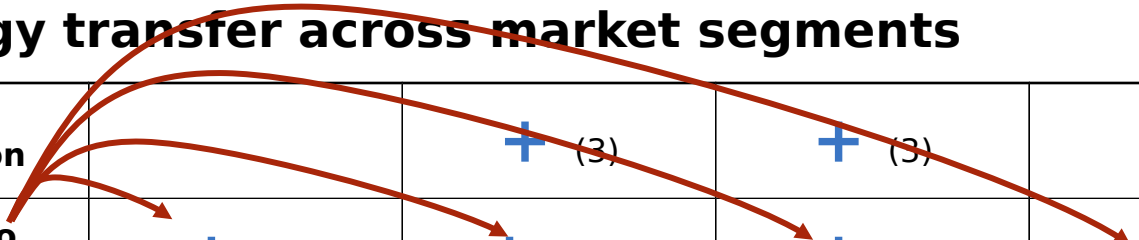
Cameron S. Miner

For more than a decade, we have worked on the integration of soldier systems

	SIPE	GEN II Soldier System	Land Warrior	FXXI LW	Air Warrior	MOUT	SPEAR	Marines LBE/BA	Intermediate Cold /Wet Glove	Navy Gloves	Imp. Chemical Glove	Scorpion
Systems Engineering												
• Functional Analysis					●			●				●
• Architecture Development		●		●	●	●						●
• Physical Integration				●	●	●						●
Product Development												
• Market Research		●			●	●			●	●	●	●
• Trade Studies	●	●			●	●			●	●	●	●
• Design	●	●		●	●	●		●	●	●	●	●
• Engineering	●	●	●		●			●	●	●	●	●
• Rapid Prototyping	●	●		●	●	●		●	●	●	●	●
• Producibility engineering	●				●			●	●	●	●	●
Test and Evaluation												
• User Assessment/Focus Group	●	●		●	●	●	●	●	●	●	●	●
• Experimental Design				●	●		●					●
• Test Plan Development	●	●		●	●	●	●	●	●	●	●	●
• Test Execution	●		●	●	●	●	●	●	●	●	●	
MANPRINT												
• Program Lead					●							
• Human Systems Integration					●	●	●					●
• Human Factor Engineering		●	●		●	●	●	●	●	●	●	●
• Safety & Health Hazard Assessment		●			●				●			

- Designed Protective Subsystem including body armor, load bearing equipment (LBE) and all clothing layers
- Physically integrated all components of the five subsystems comprising the GEN II system into an integrated, soldier-centered design
- Provided MANPRINT & System Safety support for the Protective Subsystem
- Current work on wearable medical monitors, multimedia recorders, and systems which will be used to evaluate the effectiveness of various multimodal interface technologies.

Technology transfer across market segments



	Military	Medical	Industrial	Professional	Consumer
Trauma Protection			+ (3)	+ (3)	+
Chem/Bio Protection		+ (1)	+ (1,2)	+ (2)	+ (2)
Load Carriage			+	+	+
Thermal Management		+	+		+
Hydration				+	+
Info Access		+	+	+	+
Communication Technology		+	+	+	+

1 – Biohazard protection, 2 – Environmental Hazards, 3 – Crush/Impact protection

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Addressing the needs of first responders

	Military	First Responders
Trauma Protection		+
Chem/Bio Protection		+
Load Carriage		+
Thermal Management		+
Hydration		+
Info Access		+
Communication Technology		+

	Military	First Responders
Medical Monitoring		+
Chem/Bio Sensors		+
Robotic Assistance		+
Location Tracking		+
Delivering Medication		+
User Interface		+
Non-verbal Communications		+

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Medical monitoring and peer to peer network on the battlefield

- Personal Status Monitor (PSM) tracks health status
  - Cardiac monitor
  - Respiration / O2 Saturation
  - Hydration
  - Metabolic rate
- Video and audio recording capability
  - Wirelessly transmits information with ID tag
  - Relays information to base station
  - May use accelerometer to provide coarse location info where GPS is not available

Medical monitoring and peer to peer network on the battlefield

- Multimodal User Interfaces for Extreme Users
  - People in high-performance, high-risk environments require hands-free interfaces
  - Access to large amounts of information
  - mu ms

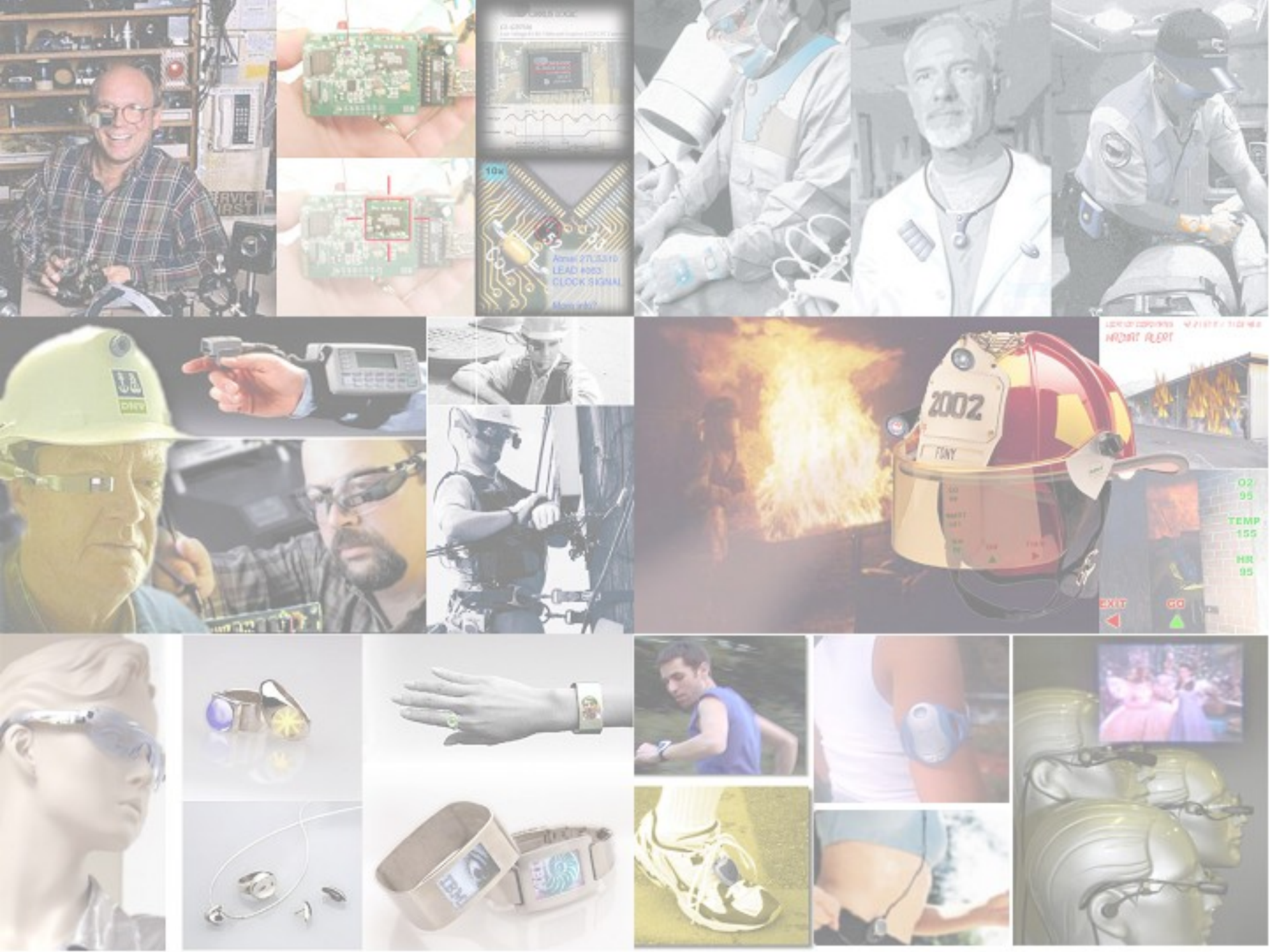
Future Wearable Systems for First Responders

- Paramedic/Surgeon Scenario
  - Hands Free Interface
  - Heads-Up Vital Monitoring
  - Overlay Care Guidelines
  - Live Video Broadcast
  - Protocol Advisor / Monitor

Wearable Systems for Government and Law Enforcement Agents

Important issues to address in Wearable Systems

- **User interface and human factors**
  - Wherever people interact with technology, we need to identify and resolve issues related to human performance and safety
  - Want to create a device with a “transparent” user interface with a focus on human performance
- **Portable power**
  - We need to explore other storage/generation technologies (Chemical, Electrical, Mechanical, Parasitic Power Harvesting)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